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REMARKS

Claims 1-3, 6, and 10-40, and 42-57 are pending in the above referenced application. Claims 1-3, 6, and 10-39, and 42-55 and 57 are rejected. Claims 40 and 56 are objected to. The applicant gratefully acknowledges the statement in the current Office Action that claims 40 and 56 contain patentable subject matter and would be allowed if rewritten in independent form.

Applicants respectively request reconsideration in view of the following claim amendments and remarks.

I. 35 U.S.C. § 112 Claim Rejections

Claim 36 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. The Office Action states that there is insufficient antecedent basis for a "lever mechanism" and "third contact region" in either claim 28 or independent claim 11. Claim 36 has been amended to properly recite a "movable mechanism" and "second contact region" as recited in claim 11.

Claim 42 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Claim 42 is dependent on canceled claim 41. Claim 42 has been amended to properly depend upon claim 39.

II. 35 U.S.C. § 102(e) REJECTIONS

Claims 11, 13-19, and 27-28 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by De Los Santos *et al.* (US 6,040,611). The Office Action states that De Los Santos *et al.* discloses a MEM device comprising a movable mechanism residing adjacent [to] a substrate; an abrasion resistant material localized on a first portion of the movable mechanism (30b) and *inter alia*, a second contact region (24b) comprising an abrasion resistive material that resides on the substrate, wherein the second contact material is similar to the first portion

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material. The Office Action asserts that it is inherent that the first portion of the mechanism would be subject to abrasion as the first portion of the mechanism becomes operationally coupled to the second contact region. The Office Action further asserts that the movable mechanism and the second contact region contain TiW, an art recognized abrasion resistant material.

5 The applicant respectfully disagrees. To anticipate a claim, a single source must contain all the elements of the claims, "arrange as in the claim." *Richardson v. Suzuki Motor Co.* 868 F.2d. 1226, 1236, 9 U.S.P.Q2d 1913, 1920 (Fed. Cir 1989). De Los Santos *et al.* describe multiple processes to form the structures of their MEMS device. In all processes described, the Ti-W is used as an adhesion layer for Au (column 5, lines 9-12). The Office Action refers to the De Los Santos *et al.* teaching at column 6, lines 62-65 and at column 5, lines 24-26 to show the content of TiW. However, that reference discusses the etching away of the TiW layer to allow the separation of the TiW-Au layer (TiW being the adhesion layer) into the first and second contact pads (30a and 30b), as well as the interconnection lines (24a and 24b). Therefore, the contact pads comprise Au and are not an abrasive resistant material. The De Los Santos *et al.* reference does not anticipate the present invention because it does not contain all the elements of claim 11 and the claims depending therefrom.

10 Claims 39, 42-50, 52-55 and 57 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Ruan *et al.* (US 6,469,602). The Office Action states that Ruan *et al.* disclose an integral micro-machined structure for enclosing a MEM device comprising a structure (512) extending from a substrate (102) and enclosing the MEM device; and a cover structure extending on a portion of the substrate structure (506) a contact region (508) provided on the cover substrate structure and acting as a pull-back contact for a MEM device residing on the substrate.

20 The applicant respectfully disagrees. The Ruan *et al.* patent describes a micro-magnetic relay having a first substrate (104) and a second substrate (504), and a conductor (114) formed on the second substrate, said conductor may be coated with an insulating layer (506). Ruan *et al.* state "(t)o create a relay (100), the various components may be formed on the substrates (104) and (504), and then the substrates may be aligned and positioned as appropriate." Ruan *et al.*

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also state, "(t)he two substrates (104) and (504) (and various components formed thereon) may be separated from each other by spacers such as spacers (510) and (512) in Figure 5." Ruan *et al.*, therefore, describe two substrates separated by spacers. Ruan *et al.* do not describe a cover structure residing on a portion of a substrate structure, and therefore do not describe all the elements in the applicant's claim, arranged as in the claim. For at least this reason, Ruan *et al.* is not anticipatory to claim 39 or the claims depending therefrom.

III. 35 U.S.C. § 103(a) REJECTIONS

Claims 1-3, 6 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Daneman *et al.* (6,528,887) in view of Lin *et al.* (NPL reference U). The Office Action states that Daneman *et al.* describes a MEM device which is inherently subject to abrasion as it closes. The Office Action also states that Daneman *et al.* fails to disclose a rib enforced mechanism and relies on the Lin reference to provide a teaching of a movable micro-machined structure comprising a rib enforced lever mechanism. The Office Action asserts that it would have been obvious to one of skill in the art at the time the invention was made to use the rib enforced lever of Lin *et al.* in the switch of Daneman *et al.*, motivated by the teaching of Lin *et al.* that using a rib enforced lever reduces deformation and extends the lifetime of a switch device.

The applicant respectfully disagrees. The American Heritage dictionary defines *lever* as "A simple machine consisting of a rigid bar pivoted on a fixed point and used to transmit force, as in raising or moving a weight at one end by pushing down on the other." Both Daneman *et al.* (Figure 5) and Lin *et al.* (Figure 1) describe beams, not levers. The Lin *et al.* reference describes the increase in bending stiffness of a micromachined beam when a rib-reinforced design is used. The teaching or suggestion to combine or modify references, and the reasonable expectation of success in so doing, must be found in the prior art and must not be based on Applicants' disclosure. See *In re Vaack*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). There is no reasonable expectation of success suggested by either reference, that a design used to stiffen a beam would work in a lever mechanism. The applicant disagrees that an arm or beam would read on the term lever as defined by the dictionary or in the applicant's specification.

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Claims 12 and 37 are rejected under 35 U.S.C. §103(a) as being unpatentable over De Los Santos *et al.* ('611) in view of Daneman *et al.* ('887). The Office Action states that De Los Santos discloses all of the elements of the referenced claims, but fails to teach the use of a diamond material as an abrasion resistant material. The Office Action relies on Daneman *et al.* to provide the teaching of a movable mechanism with a diamond material on a first portion of the movable mechanism. The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the diamond material of Daneman *et al.* because diamond is well known in the art as the hardest material on Mohs scale and thus would have improved the abrasion resistance. Additionally, the Office Action states that De Los Santos *et al.* fails to teach an integral enclosure, but relies upon Daneman *et al.* to provide the teaching of a movable micro-machine structure with an integral enclosure that electrically shields and encloses the MEM device. The Office Action asserts that it would have been obvious to one of skill in the art at the time the invention was made to use the integral enclosure of Daneman *et al.* because it is well known in the art that the insulating enclosure would have both reduced the switch's susceptibility to electrical noise and protected it from environmental conditions, such as moisture and contamination.

The applicant respectfully disagrees. The deficiencies of the De Los Santos *et al.* reference have been discussed previously. The contact pads (30a and 30b of De Los Santos) as well as the interconnection lines (24a and 24b) are made of a conductive material. However, De Los Santos *et al.* describe the ability to control the speed of the contact between the interconnection lines and the contact pads as the mechanism of extending the contact life. There simply is no motivation from the De Los Santos *et al.* teaching to use an abrasion resistive material such as diamond for the conductive layer because abrasion resistance was solved by the ability to control the contact speed.

Claims 20-23 29-31, 34-36, and 38 are rejected under 35 U.S.C 103(a) as being unpatentable over De Los Santos *et al.* in view of Lin *et al.* The Office Action states that the process limitations of the claims 22, 23 and 36 invoke the product by process doctrine, and

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therefore anticipation only requires that the layer has a planar surface. The Office Action states that De Los Santos *et al.* fails to disclose the surface to define an integral rib. The Office Action relies upon Lin *et al.* to teach a movable mechanism with a second surface defining an integral rib. The Office Action asserts that it would have been obvious to one of skill in the art at the
5 time the invention was made to use the rib enforced mechanism of Lin *et al.* in the switch because Lin *et al.* teach that the standard levers used in switches become deformed under electrostatic forces, and using a rib enforced lever reduces this deformation.

The applicant respectfully disagrees. "The mere fact that the prior art could be so modified [to produce the claimed device] would not have made the modification obvious unless
10 the prior art suggested the desirability of the modification." In re Gordon, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). The deficiencies of the De Los Santos reference have been discussed previously. De Los Santos *et al.* describe a flexible cantilever beam. Further, De Los Santos *et al.* describe the operation of the switch being controlled by the voltages applied on either side of the anchor; hence the switching frequency is independent from the stiffness of the
15 beam (column 4, lines 58-63). Therefore, one of skill in the art would not have been motivated to modify the De Los Santos *et al.* switch with a rib enforced beam because there is no suggestion that increasing the stiffness of the flexible beam would improve the switch.

Claims 24-26, and 33 are rejected under 35 U.S.C 103(a) as being unpatentable over De Los Santos *et al.* in view of Lin *et al.* and further in view of Daneman *et al.* The Office Action
20 states that the De Los Santos and Lin references fail to explicitly teach an integral enclosure that electrically shields and encloses the MEM device. The Office Action relies on Daneman *et al.* to teach a MEM device comprising a movable micro-machined structure with an integral enclosure that electrically shields and encloses the MEM device. The Office Action asserts that it would have been obvious to one of skill in the art at the time the invention was made to use the integral
25 enclosure of Daneman *et al.* in the device described by De Los Santos *et al.* in view of Lin *et al.* because it is well known in the art that the insulating enclosure would have both reduced the switch's susceptibility to electrical noise and protected it from environmental conditions.

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Additionally, the Office Action states that the De Los Santos *et al.* and Lin *et al.* references fail to teach the conductive layer to comprise diamond. The Office Action relies on Daneman *et al.* to provide a movable mechanism with a conductive diamond material on the mechanism. The Office Action states that it would have been obvious to one of skill in the art at the time the invention was made because diamond was well known as the hardest material and would have improved the abrasion resistance.

The applicant respectfully disagrees. The deficiencies of De Los Santos *et al.* and Lin *et al.* have been discussed previously. For the reasons stated above, the applicant asserts that De Los Santos *et al.* in view of Lin *et al.* do not disclose all the elements of the cited claims.

Additionally, as described above, Daneman *et al.* do not describe an *integral* enclosure. However, assuming *arguendo* that De Los Santos *et al.* in view of Lin *et al.* did provide the claimed elements, they do not provide any suggestion or motivation for an integral enclosure or a conductive layer comprising diamond. The Office Action states that the motivation would have come from the general knowledge in the art that an enclosure would have reduced the switch's susceptibility to electrical noise and protected it from environmental conditions. There is simply no suggestion in De Los Santos *et al.* in view of Lin *et al.* that electrical noise or environmental conditions would be a problem needing improvement. Additionally, De Los Santos *et al.* describes controlling the speed of contact to extend the contact life, thereby offering no motivation to use a conductive layer comprising diamond. Therefore, there exists no mention or suggestion in the prior art that the enclosure or the diamond conductive surface would improve the invention of De Los Santos *et al.* in view of Lin *et al.* For at least the reasons provide above, claims 22-24 and 33 are not obvious over De Los Santos *et al.* in view of Lin *et al.* and further in view of Daneman *et al.*

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Los Santos *et al.* in view of Lin *et al.* and further in view of Ruan *et al.* The Office Action states that the above references do not teach the conductive layer to comprise copper. The Office Action relies on Ruan *et al.* to provide a MEM device comprising a movable mechanism with a conductive

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copper material on the mechanism. The Office Action asserts that it would have been obvious to one of skill in the art at the time the invention was made because Ruan *et al.* teach copper is an art recognized functional equivalent to the gold containing conductive layer of De Los Santos *et al.*

5 The applicant respectfully disagrees. The deficiencies of De Los Santos *et al.* in view of Lin *et al.* have been discussed previously. Applicant asserts that the De Los Santos *et al.* and Lin *et al.* references do not teach a rib enforced lever mechanism comprises a rib that is integral to said lever mechanism, and wherein said rib comprises a conductive layer. Therefore, the combined references do not teach all of the elements of the claimed invention. Further there is no
10 suggestion or incentive supporting the substitution of copper for gold in the conductive layer. Simply because the metals are functionally similar does not provide an incentive to make the substitution.

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruan *et al.* in view of Clevenger *et al.* (U.S. Application No. 20010014526). The Office Action states that
15 Ruan *et al.* fail to teach the structure for enclosing the device to comprise diamond. The Office Action relies on Clevenger *et al.* to provide a method of forming a microelectronic device having an enclosed cap comprising diamond. The Office Action asserts that it would have been obvious to one of skill in the art at the invention was made to use the diamond material of Clevenger *et al.* in the enclosing cap of Ruan *et al.* because a diamond cap would have provided improved
20 thermal conductivity over the material and allowed the dissipation of heat.

The applicant respectfully disagrees. The deficiencies in the Ruan *et al.* reference have been discussed previously. The applicant asserts that the Ruan *et al.* reference does not disclose all of the elements of the rejected claim. In particular, Ruan *et al.* does not discuss a structure extending from a substrate and at least partially enclosing at least one MEM device.

25 Additionally, Ruan *et al.* provide no teaching, suggestion or incentive for the desirability of an enclosure having thermal conductivity.

For at least the reasons stated above, the applicants respectfully request that the rejections

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under 35 U.S.C. 103(a) be withdrawn.

In view of the remarks and amendments above, the applicants respectfully submit that the present application is in condition for allowance and solicits action to that end. If there are any additional matters that may be resolved or clarified through a telephone interview, the Examiner
5 is respectfully requested to contact applicant's undersigned representative.

Respectfully submitted,

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